A rare case of *Brucella abortus* endocarditis in South Africa

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**Introduction**

Brucellosis is a zoonotic infection that may affect any organ. Humans usually acquire the disease through exposure to infected animals and their fluids and from ingestion of unpasteurized milk/dairy products. *Brucella melitensis* and *Brucella abortus* are the commonest species that cause disease in humans. The infection usually manifests as a febrile syndrome, without an obvious focus, accompanied by chills, sweating, arthralgia and myalgia. The musculoskeletal system is most frequently affected. Cardiovascular involvement is rare and occurs in less than 2% of patients.¹

We report a case of *Brucella abortus* infective endocarditis of a prosthetic valve, which to the best of our knowledge, has not previously been documented in South Africa.

**Case report**

A 21 year male patient from northern KwaZulu-Natal with a background history of rheumatic valvular heart disease underwent a double valve replacement in 2005. In August 2012, at his cardiac review, he complained of a one week history of malaise, fatigue and new onset worsening dyspnoea.

On examination he was mildly tachypnoeic, with a respiratory rate of 20 breaths per minute. His heart rate and blood pressure were normal. Although he was pale, he had no other clinical stigmata of infective endocarditis and was not in cardiac failure. On auscultation of the chest, he had a 3/6 early systolic murmur which was loudest over the aortic area and radiated to the carotids as well as a 2/4 early diastolic murmur which was loudest over the left sternal border. Valve clicks were clearly audible. Other systems were normal.

A twelve lead electrocardiogram, revealed a heart rate of 72 beats per minute, in sinus rhythm with a leftward axis and a normal PR interval. The chest radiograph showed an increased cardiothoracic ratio with clear lung fields. On transthoracic echocardiogram, dysfunctional aortic valve prosthesis (AVP) with a para-valvular leak was noted (Figure 1).

Dysfunctional aortic valve prosthesis (AVP) with a para-valvular leak.

An echogenic mass was attached to the AVP and early abscess formation was seen in the aortic root (Figure 2).

Echogenic mass attached to the AVP with early abscess formation seen in the aortic root.

**Figure 1:** Transthoracic echocardiogram

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**Abstract**

Brucella endocarditis is a rare condition which occurs as a focal complication of chronic brucellosis. We report a case of *Brucella abortus* endocarditis in a 21 year old male with a prosthetic aortic heart valve. Due to the high mortality of Brucella endocarditis, it is essential for clinicians to maintain a high index of suspicion in patients at risk for brucellosis who present with infective endocarditis.

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The mitral valve prosthesis was functioning normally. At fluoroscopy, the AVP was dehisced.

Prior to starting antibiotics, a set of blood cultures, as well as baseline haematological and biochemical laboratory investigations were done. He was thereafter commenced empirically on benzyl penicillin and gentamicin.

Laboratory findings on admission showed the following: urinalysis normal; haemoglobin 7.9 g/dl (microcytic, hypochromic anaemia), white cell count 5.90 x 10^9 cells/L, platelets 136 x 10^9 cells/L, international normalised ratio (INR) of 7, normal urea and electrolytes, liver function was normal with the exception that the albumin was 31 and the globulin fraction 51, retroviral test was negative, C reactive protein was 52 mg/L, and the erythrocyte sedimentation rate was 65 mm/hr.

At surgery, it was discovered that the AVP had dehisced from the site of implantation but the mitral valve prosthesis was normal. The AVP was replaced and the patient recovered well post-operatively.

The single blood culture drawn on admission flagged positive two days later on the automated blood culture instrument, however there were no organisms observed on microscopy. After 24 hours of incubation, there was no visible growth and only after 72 hours, gram negative bacilli were isolated. The gram stain of the isolate revealed small gram negative bacilli. On culture, the colonies were round, 1-2 mm in diameter, translucent with smooth margins. Growth was observed on chocolate and blood agar plates but there was no growth seen on MacConkey agar. On further biochemical testing, the colonies were indole negative, oxidase positive and catalase positive. Colonies also reduced nitrate to nitrite. Vitek 2 (bioMerieux, France) identified the organism as Brucella melitensis. A presumptive diagnosis of Brucella prosthetic valve endocarditis was made.

At this time, further occupational history was sought. The patient worked on a farm which kept cattle, sheep and pigs. His duties included herding cattle and sheep as well as milking cows. He also consumed unpasteurized milk and dairy products.

A brucella agglutination test and two more sets of blood cultures were performed after the blood culture results were available. Serology showed titres of 1:1280 for both Brucella melitensis and Brucella abortus. Repeat blood cultures were negative.

The histology report on both mitral and aortic valve showed features in keeping with acute on chronic valvulitis. However special stains for bacteria and fungi were negative. The aortic valve was sent for microbiological culture but there was no growth after 48 hours of incubation.

The isolate was sent to a reference laboratory for molecular analysis. Bruce-ladder Multiplex polymerase chain reaction confirmed that the isolate was Brucella abortus.

Oral doxycycline 100 mg twice daily and intravenous rifampicin 600 mg daily was commenced for a duration of 8 weeks. Gentamicin was continued for a total of 20 days. The patient improved markedly and was discharged. He remained well during his follow up clinic visit.

Discussion

Brucellosis impacts significantly on the economy of countries where the disease is endemic. These areas include the Arabian Gulf, Mediterranean region and Mexico. Brucellosis is also prevalent in North Africa and exists throughout sub-Saharan Africa. In South Africa, human brucellosis was recorded as early as 1894 in the Free State. Subsequently, the disease was identified in the Cape, Transvaal and Natal. In 1962, the incidence in Transvaal was reported to be 0.2 per 100 000. Since the 1960's, there has been little documentation of human brucellosis and this may be attributed to vaccination of livestock. However, outbreaks of brucellosis in cattle and sheep have been reported in South Africa. The overall serological prevalence of brucellosis in cattle in KwaZulu-Natal is 1.45% with the highest prevalence of up to 15.5% found in the northeast areas of the province. However, the prevalence of human brucellosis in South Africa remains low.

Cardiac manifestations of brucellosis include endocarditis, myocarditis, pericarditis and aortic root abscesses. Endocarditis is the leading cause of mortality in chronic brucellosis and may involve both native and prosthetic valves. Although the overall mortality rate for brucellosis is less than 1%, infective endocarditis accounts for 80% of deaths. In endemic countries, endocarditis may be a complication in up to 10% of patients. It usually involves the aortic valve and typically requires immediate surgical valve replacement. Abscess formation occurs commonly in Brucella endocarditis and myocardial abscesses occur in up to 43% of cases. Valve dehiscence due to ring abscesses have been reported, as was the case in our patient. The clinical features of Brucella endocarditis are indistinguishable from endocarditis caused by other more common organisms. Therefore, in a patient with a strong epidemiological link, a high degree of suspicion and subsequent appropriate diagnostic evaluation is essential.

According to The World Health Organization (WHO), the isolation of Brucella spp. from the patient’s blood sample or tissue is diagnostic of brucellosis. However, blood culture yield ranges from 15-70%. Automated continuous monitoring blood culture systems are able to detect brucella within 7 days. Nevertheless, the recommendations state that subcultures be conducted for up to 4 weeks to ensure optimal recovery, especially if the disease is strongly suspected. In our case, the organism was detected after only 48 hours which could be attributed...
to the continuous monitoring system used in our laboratory. 

Brucella spp was not isolated from the aortic valve tissue because the sample was only incubated for 48 hours. Brucellosis was not suspected in the patient and contact with farm animals was only ascertained after the culture results were available. This case thus highlights the need for thorough occupational and social history-taking as part of the diagnostic workup. In addition, the manipulation of specimens or cultures harbouring Brucella spp. is hazardous and therefore appropriate laboratory safety measures need to be followed.

Due to the difficulty in diagnosing brucella by culture, serology has been used to make the diagnosis. The serum agglutination test has been widely used with titres $>1:160$ being suggestive of disease.12 However, ELISA testing has been shown to be more sensitive and specific than the serum agglutination assay.12 Real-time PCR, where feasible, offers a promising alternative.13

The current recommendation for the treatment of Brucella endocarditis is combined medical and surgical treatment, especially with infected prosthetic valves.14 However, antimicrobial therapy alone has been used with some success. Our patient was treated with a combination of oral doxycycline, intravenous rifampicin and gentamicin after valve replacement. Dual or triple therapy comprising doxycycline plus aminoglycoside with or without rifampicin is the preferred regime that results in a decreased relapse and failure rate.14, 15

In order to make the diagnosis of Brucella endocarditis, there should be good communication between the clinician and the microbiologist in order for optimal culture methods to be undertaken. Brucella endocarditis should be suspected in patients who have had contact with farm animals, even in an area with a low prevalence of the disease.

In conclusion, this case highlights the need for good history taking and communication with the microbiology laboratory. This is especially important when unusual, fastidious or even potentially dangerous organisms are suspected.

References